

A NEW SPECIES OF *PARACRIAS* (HYMENOPTERA: EULOPHIDAE)  
PARASITIC ON *ANTHONOMUS* SPP.  
(COLEOPTERA: CURCULIONIDAE)

JAMES B. WOOLLEY AND MICHAEL E. SCHAUFF

(JBW) Department of Entomology, Texas A&M University, College Station, Texas 77843; (MES) Systematic Entomology Laboratory, BBII, Agricultural Research Service, % U.S. National Museum NHB 168, Washington, D.C. 20560.

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*Abstract.*—*Paracrias anthonomi* Woolley and Schauff, new species, is described and illustrated. This species was reared from *Anthonomus hunteri* in southern Mexico and is being investigated as a possible biological control agent for the boll weevil (*Anthonomus grandis*). The relationship of the new *Paracrias* to others in the genus is discussed and a revision to the key to the species is given.

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During foreign exploration for parasites of the boll weevil, *Anthonomus grandis* Boheman (Curculionidae), J. Cate and P. Krauter of Texas A&M University discovered a new species of *Paracrias* (Eulophidae: Entedoninae) attacking *Anthonomus hunteri* Burke and Cate. In order to provide a name for this species, we take this opportunity to describe it and discuss its relationship to other *Paracrias* species.

Very little is known of the biology and host associations of the previously described species of *Paracrias*. Only two species have been reared and both of these are also associated with curculionids (in the genera *Lignyodes* and *Conotrachelus* (Schauff, 1985)). In addition, one of us (MES) has recently seen specimens of another undescribed species reared from *Anthonomus aeneolus* Dietz in the state of Nuevo Leon, Mexico.

The concept of *Paracrias* given by Schauff (1985) is altered considerably by the inclusion of the species that we describe here. In spite of the numerous character differences between this species and the others currently placed in this group, naming a new

genus for this species would likely render *Paracrias* paraphyletic. We believe that the character differences in this species are autapomorphic (e.g. the elongated median propodeum and greatly reduced metanotum) and do not justify a separate genus. Since one of us (MES) is currently analyzing the relationships of this genus and its relatives, we will defer additional comment on generic relationships until that work can be completed.

Species of *Paracrias* can be separated from other genera of Eulophidae by the following characters: scutellum with a single pair of setae and submarginal vein with two setae (subfamily Entedoninae); head and mesosoma well sclerotized and not collapsed when dry; notauli incomplete, usually only present as small indentations at posterior margin of mesoscutum; mesoscutum and scutellum alveolate (Figs. 3, 5); scrobal grooves united below Y-shaped facial groove (Fig. 1); pronotum without transverse carina; metapleural protuberance with anterolateral carina (Fig. 6); scutellum without median groove; propodeum with a median raised area (Fig. 5); metasoma petiolate; mid

and hind coxal insertions widely separated; stigmal vein sessile, only about as long as wide (Fig. 9).

This species will not key through the couplets given in Schauff (1985), because it has light yellow fore and mid femora, but a distinctly ridged occiput. The key should be modified as follows:

- 1(a). Female antennae with 5 flagellomeres (without a differentiated club) (Fig. 10); pronotum reduced, barely visible from above (Figs. 3, 4); propodeum medially about equal in length to scutellum, anterior edge advanced under the scutellum (Fig. 5) and metanotum greatly reduced ..... *P. anthonomi* n. sp.
- Female antennae with 2 or 3-segmented funicle (club 2 or 3-segmented); pronotum visible from above as a narrow band; propodeum medially much shorter than scutellum, anterior edge separated from scutellum by metanotum and metanotum clearly visible as a narrow band .... 1

#### METHODS

Terminology for surface sculpturing follows Harris (1979). Morphological terminology largely follows that of Graham (1959) or Gibson (1985). Ratios are presented in the form of "scape/pedicle" (length of scape divided by length of pedicle) followed by the observed ranges. Measurements were taken from the holotype ♀, allotype ♂, and 10 ♀ paratypes and 5 ♂ paratypes using a Zeiss stereomicroscope and an eyepiece micrometer. All measurements were made at the widest or longest point of the structure. Because this species does not possess a differentiated antennal club in either sex, we use the term flagellomeres to refer to antennal segments distal to the annellus, and the abbreviations, FL1, FL2 refer to the first flagellomere, second flagellomere, etc. We use mesosoma and metasoma rather than thorax and gaster. Metasoma refers to the abdomen posterior to the propodeum, including the petiole, and tergal numbering (e.g. T2) and sternal numbering (e.g. S2) refer to the abdominal terga and sterna. The metapleural protuberance refers to the cone shaped enlargement of the metapleuron (Fig. 4) that is common in these species and re-

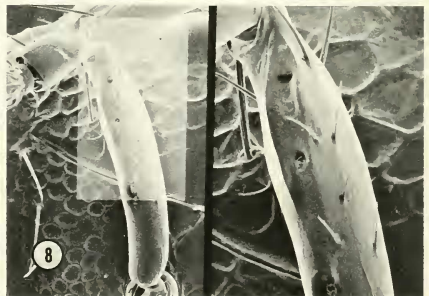
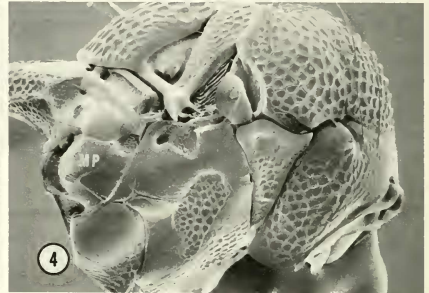
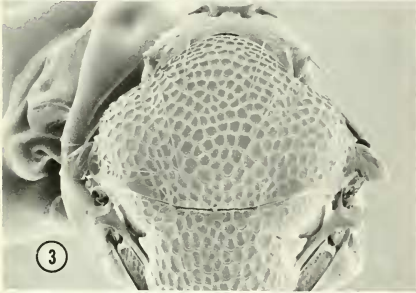
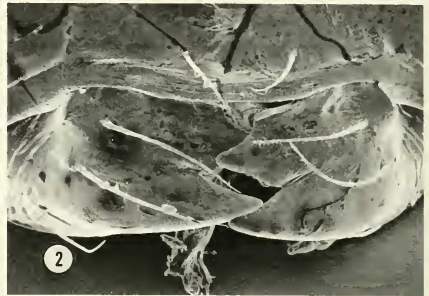
lated genera. Accession numbers preceded by a "T" in Types and Other Material Examined were assigned in the Quarantine Laboratory, Biological Control Center, Department of Entomology, Texas A&M University.

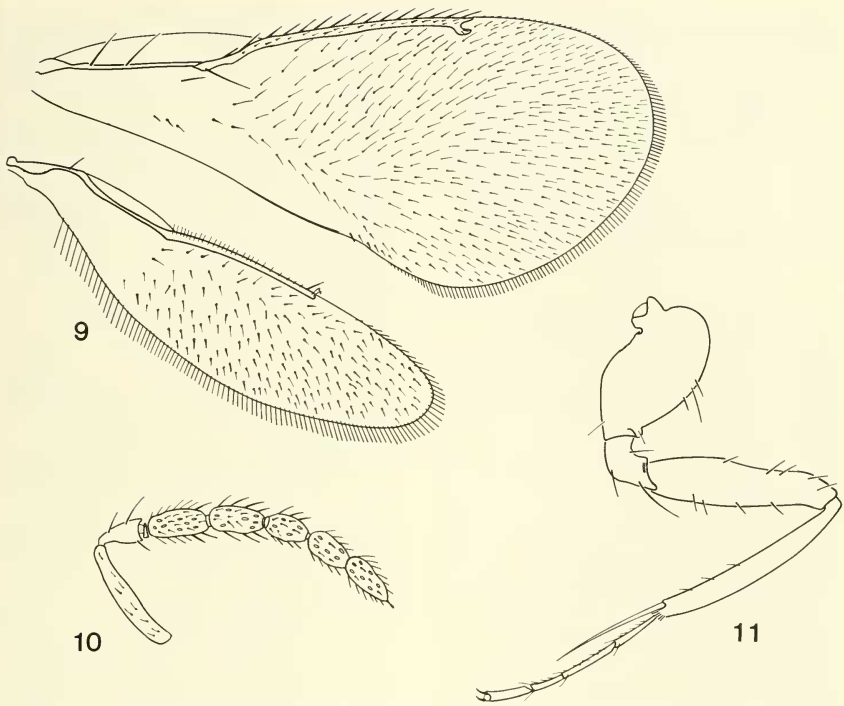
#### *Paracrias anthonomi* Woolley and Schauff, NEW SPECIES

Diagnosis.—*Paracrias anthonomi* can be separated from the other described species in this genus by the following: mandibles with 2 teeth of equal size (Fig. 2) (other species with one large tooth and one small tooth); female antennae without club (Fig. 10) (other species have a 2- or 3-segmented club); pronotum reduced dorsad, barely visible from above (Fig. 3) (pronotum visible as a narrow band dorsad in other species); anterior edge of propodeum produced forward under scutellum (Fig. 5) (scutellum clearly separated from propodeum by metanotum in other species) and propodeum (Fig. 6) medially about equal in length to length of scutellum (propodeum much shorter than scutellum in other species).

The elongate, neck-like, posterior medial extension of the propodeum of this species is distinctive and immediately distinguishes it from the other described species of *Paracrias*. Although there generally is some posterior elongation of the propodeum in other *Paracrias* spp., the length of the extension in *P. anthonomi* far exceeds that of the others. However, like some of the other characters in which *P. anthonomi* differs from other species of this genus (e.g. antenna without differentiated club), an elongate propodeum is found in other Entedoninae and it commonly occurs in Neotropical species of related genera such as *Horismenus*.

Female.—Length 2.1–3.2 mm. Color as follows: scape, fore, middle, and hind legs except coxae pale tan; apical spur on hind tibia white in proximal half and black in distal half; frons, vertex, mesoscutum, scutellum, axillae, propodeum, and all coxae





Figs. 9–11. *Paracrias anthonomi*, female paratype. 9, Fore and hind wings. 10, Antenna. 11, Hind leg.

black with metallic green, bronze, or occasionally blue or purple reflections; propodeum occasionally with reddish reflections, particularly in medial area; metasoma black with metallic blue reflections. Fore and hind wings hyaline.

Head.—Head height 0.70–0.80 the length of head width. Inner margins of eyes subparallel, diverging slightly medially (Fig. 1); occipital ridge distinct behind ocelli, continuing about halfway to eye margin; occi-

put reticulate; vertex smooth and shining; facial grooves deep and well-defined, extending laterad to eye margin; frons above facial grooves alveolate, below facial grooves minutely alveolate; area between toruli raised, shining, faintly coriaceous, raised triangular area defined by lateral carinae extending down face to mouth margin; clypeus undifferentiated; malar sulcus present; scape/pedicel 2.27–2.85, one transverse anellus present, FL1/pedicel 1.12–1.50, FL2/

Figs. 1–8. SEM's of *Paracrias anthonomi*. 1, Head, frontal view. 2, Mandibles. 3, Thorax, dorsal view. 4, Thorax, lateral view (mp = metapleural protuberance). 5, Scutellum and propodeum. 6, Propodeum, posterolateral view. 7, Metasoma, lateral view. 8, Male scape.

pedicel 1.0–1.25, FL3/pedicel 0.80–1.10, FL4/pedicel 0.86–1.17, FL5/pedicel 1.12–1.50.

Mesosoma.—Prepectus minutely alveolate, smooth along dorsal and posterior margins; metapleural protuberance smooth (Fig. 4), coriaceous below antero-lateral carina, alveolate to coriaceous posteriad; mesoscutum, scutellum and axillae alveolate; propodeum (Figs. 5, 6) with antero-medial area only slightly convex and coriaceous-reticulate with weak longitudinal striations, smooth shining lateral areas set off by sharp carinae, posterior "neck" with alveolate dorsal and minutely alveolate ventral areas divided by ventro-longitudinal carinae, sunken spiracular area coriaceous, callus smooth and bearing one seta.

Fore femur and fore tibia subequal in length, fore basitarsus/fore tibia 0.20–0.27, middle femur/middle tibia 0.88–0.97, mid-tibial spur/middle basitarsus 0.75–0.91, hind femur/hind tibia 0.98–1.14, hind tibia (Fig. 11) with apical spur subequal in length to or slightly shorter than the basal two tarsomeres; hind coxae elongate (Fig. 11), length/width 1.73–2.14, rounded and smooth in dorsal view, medial surface reticulate, lateral surface with medial patch of coriaceous sculpture; length of fore wing (Fig. 9) 2.23–2.47 times its width, marginal vein/submarginal vein 0.92–1.11, stigmal vein/marginal vein 0.05–0.10, postmarginal vein about as long as wide, membrane under the proximal portion of marginal vein evenly setose, setae shorter and more dense distal to marginal vein.

Metasoma.—Ovate-acuminate, tapering strongly posteriad; petiole (Fig. 7) subconical, smooth, shining; T2 slightly longer than all remaining terga combined, smooth, shining, without setae; T3–T4 or T3–T5 often hidden beneath T2, exposed portions of T3–T5 transverse, T6 slightly so, T7 subquadrate, syntergum long, acuminate; combined lengths at midline of exposed portions of terga in following proportions: T2 slightly longer than T3-syntergum, T3–5 subequal to T6, T3–6 subequal to T7, T3–

7 subequal to syntergum; S2 (Fig. 7) exposed anterior to T2, other sterna concealed by terga; ovipositor sheaths concealed under syntergum in basal half, exposed parts about  $\frac{1}{3}$  length of syntergum in lateral aspect.

Male.—Length 2.0–2.4 mm. As described for the female except: anterior margin of scape (Fig. 8) darkened in dorsal  $\frac{1}{2}$ – $\frac{3}{4}$ , with 3 small pits set in an elongate indentation; frons and face with brilliant metallic blue or occasionally green reflections, mesoscutum and propodeum with purple or occasionally green or gold reflections, pleural regions and coxae metallic blue, scape/pedicel 2.50–2.83, 1st annellus transverse, 2nd annellus reduced to a small semicircular ridge on ventral surface, FL1/pedicel 1.33–1.50, FL2/pedicel 1.17–1.33, FL3/pedicel 1.0–1.25, FL4/pedicel 1.0–1.25, FL5/pedicel 1.67–2.0; medial surface of hind coxae weakly coriaceous-reticulate; petiole longer and more cylindrical than female, widening apically, about  $\frac{2}{3}$  length of medial propodeum; T2 ovate, strongly truncate apically, with large antero-medial depression, covering remaining terga or occasionally with syntergum exposed (air-dried specimens), with 3–5 scattered, lateral setae; fore wing 2.16–2.28 times longer than wide, marginal vein/submarginal vein 0.87–1.11, stigmal vein/marginal vein 0.05–0.06.

Biology and distribution.—Known hosts of *P. anthonomi* are *Anthonomus hunteri* and an undescribed *Anthonomus* sp. (not closely related to *hunteri*, det. H. R. Burke). Material was reared primarily from buds of *Hampea trilobata* Standley (Malvaceae). In one case specimens were reared from fruit of *Lycianthes synanthera* Bitt. (Solanaceae), which were infested with weevil larvae. Adult parasites emerge from 2nd or 3rd instar weevil larvae. The species is apparently a primary parasite, as no evidence of hyperparasitism has been noted (J. R. Cate and P. C. Krauter, personal communication). The species is known only from the states of Yucatan, Quintana Roo, Campeche, and Chiapas in southern Mexico.

Types.—Holotype ♀ on point with data:

"Mexico, Quintana Roo, Akumal-Tulum, 18–20 November 1985, ex *Anthonomus hunteri*, on: *Hampea trilobata*, colls. P. Krauter & D. Hutchinson, T85708 & T85709" (deposited in USNM). Six ♀ paratypes on points and one slide-mounted ♀ paratype (USNM) with same data. Allotype ♂ (USNM), 10 ♀ paratypes on points, 6 ♂ paratypes on points and one slide-mounted ♂ paratype (USNM) with data: "Mexico, Yucatan, East of Valladolid, 2-X-1984, colls. J. R. Cate and P. C. Krauter, ex. *A. hunteri* on: *H. trilobata*, T84073 & T84074." One ♀ and 2 ♂ paratypes on points with data "Mexico, Yucatan, Merida, 2-X-1984, coll. R. Fisher, ex. *A. hunteri* on: *H. trilobata*, T84075 & T84076." 16 ♀ and 6 ♂ paratypes on points with data: "Quintana Roo (S. Tulum to N. Coba) and Yucatan (Xalau & Yalcoba to Nueva X-Can), 28-X-1-XI-1986, colls. P. C. Krauter & J. R. Cate, ex: *A. hunteri*, on: *H. trilobata*, T86084 & T86085." Paratypes have been deposited in the USNM (10 ♀, 3 ♂), CNC (4 ♀, 2 ♂), BMNH (1 ♀, 1 ♂), and Texas A&M University (TAMU) (19 ♀, 9 ♂).

Other material examined.—All from Mexico (deposited in TAMU): CAMPECHE, Escarcega, 9-X-1976, colls. J. R. Cate & W. E. Clark, ex: *A. hunteri*, on: *H. trilobata*, 5 ♀. CHIAPAS, Belisario Dominguez, Km. 27 & 32, Hwy 200, 10-IX-1985, ex: *Anthonomus* sp. (not *hunteri*), on: *Lycianthes synanthera*, colls. J. R. Cate & P. C. Krauter, T85056, 1 ♂ and host remains. QUINTANA ROO, Coba, 20-21-X-1985, ex: *A. hunteri*, on: *H. trilobata*, colls. J. R. Cate & P. C. Krauter, T85069, 1 ♀, 1 ♂; Tulum S. to Felipe Carrillo Puerto, 22-X-1985, ex: *A. hunteri*, on: *H. trilobata*, colls. J. R. Cate & P. C. Krauter, T85070, 1 ♂. YUCATAN, 9-I-1984, coll. R. Fisher, ex: *A. hunteri*, on: *H. trilobata*, T84001, 1 ♀; 15 Km. E. Celestun, 15-X-1981, coll. D. W. Williams, ex: *A. hunteri*, on: *Hampea* bud, 1 ♂; Dzitas, 8-VIII-1984, ex: *A. hunteri*, on: *H. trilobata*, coll. J. R. Cate, T84044; 4 Km. SE Tunkas, 12-X-1983, coll. P. Stansley, reared from *H. trilobata* bud, T83021, 1 ♂;

Valladolid, 14-X-1976, colls. J. R. Cate & W. E. Clark, ex. *A. hunteri*, on: *H. trilobata*, 3 ♀, and 2 ♂; Valladolid (Km 185/164 -Xelton/Tezold), 29-X-1984, ex. *A. hunteri*, on: *H. trilobata*, coll. R. Fisher, T84084, 1 ♂; Yalcoba, 19-X-1985, ex. *A. hunteri* on: *H. trilobata*, colls. J. R. Cate & P. C. Krauter, T85068, 2 ♀, 1 ♂.

**Etymology.**—The specific name is the genitive form of *Anthonomus*, the generic name of the host.

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